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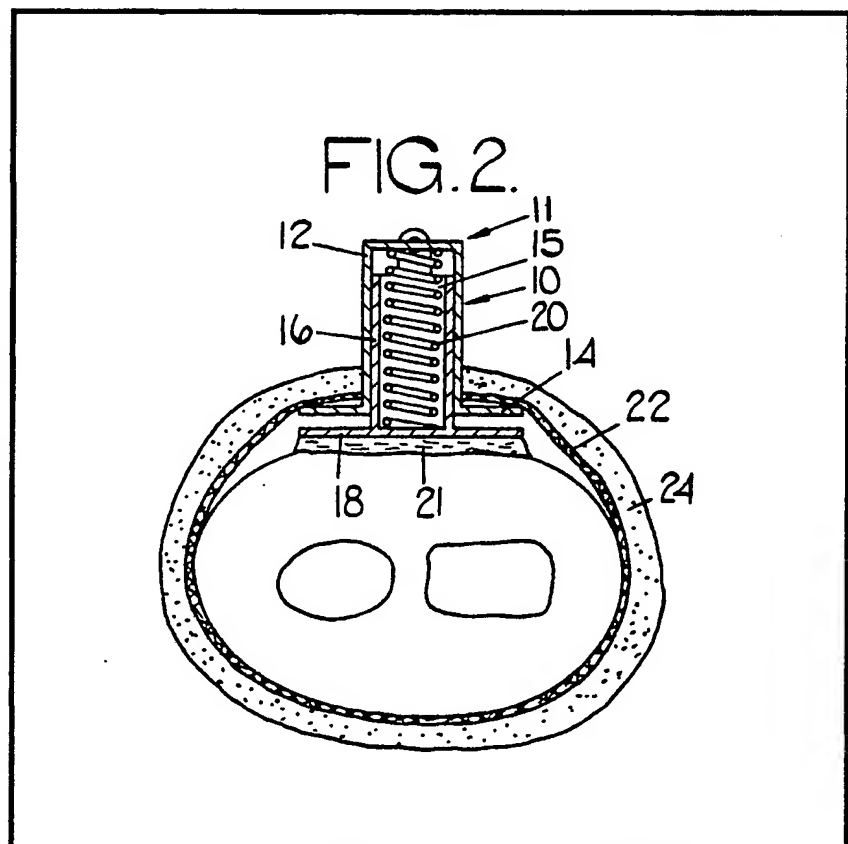
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(54) Device for inclusion in an immobilising structure for a limb, and limb immobilising structures including such devices

(57) A plaster splint 24 for immobilising a limb includes a device 10 having a part 11 which is secured to the splint 24 and a part 15 which is slidable relative to the part 11 and which is biased to apply pressure to the limb by means of a spring 20. The device 10 may be sited to prevent relative slippage between fractured bone parts during the period when the splint 24 is applied. Adequate pressure continues to be applied by the device 10 even when swelling accompanying the fracture decreases, and during muscular movement within the splint 24.



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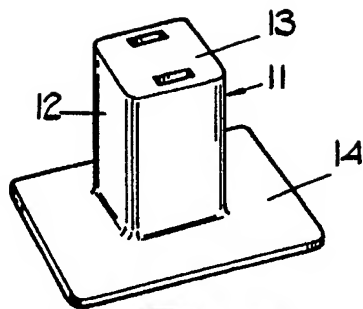


FIG. 1.

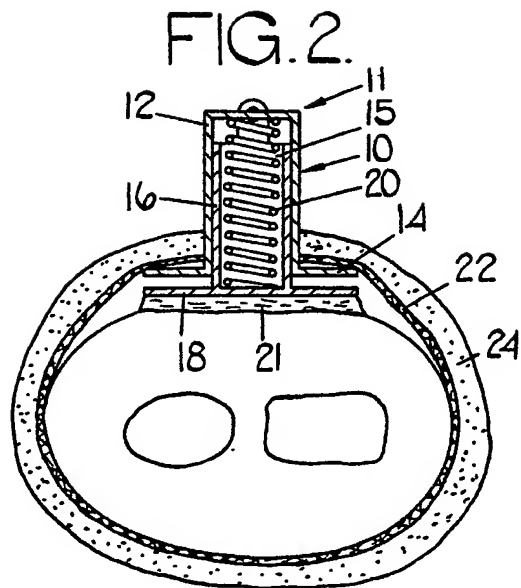
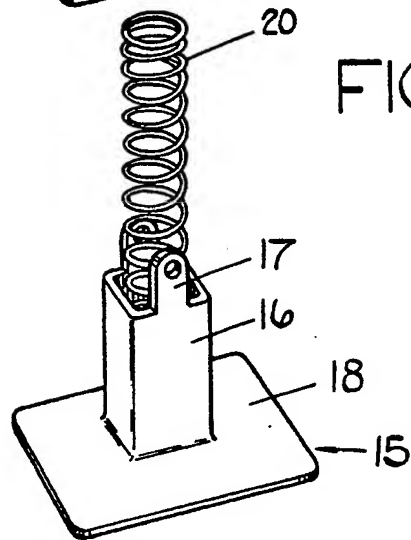
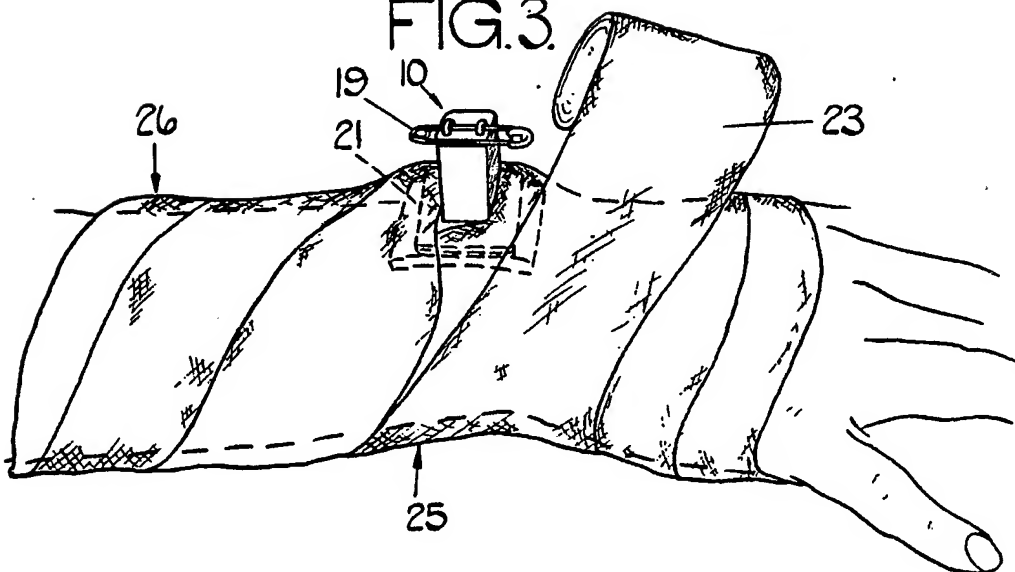


FIG. 3.



## SPECIFICATION

### Device for inclusion in an immobilising structure for a limb and limb immobilising structures including such devices

This invention relates to a device for inclusion in a splint structure for a limb and also to a splint structure incorporating such a device.

- 10 It is common medical practice to use a splint structure, for example, a plaster cast, for immobilising a limb or a part thereof, and in particular to apply a splint structure to a limb having a bone fracture, after the fracture
- 15 has been reduced. Fractures are usually accompanied by swelling of the surrounding tissues, the swelling decreasing after the fracture is reduced. After the swelling have decreased the splint structure will no longer be
- 20 firm at the area of the fracture. Additionally, muscle movement causes redistribution of the volume of the limb tissues within the splint, and the relative positions of the fractured bone parts may thereby be altered during the
- 25 healing process. Such alteration can adversely affect the subsequent mobility of the limb.

- It is an object of the invention to provide a device for incorporation in a splint structure to improve the effect of the structure in restraining
- 30 relative movement between the parts of a bone on opposite sides of a fracture.

- It is a further object of the invention to provide a splint structure having an improved effectiveness in restraining the aforesaid relative
- 35 movement.

- According to the invention there is provided a device for incorporation in an immobilising structure for a limb, said device comprising a first part adapted to be secured to said structure, a second part for engaging a limb which
- 40 is immobilised by said structure, and a spring engaged between said first and second parts, for biasing said second part into engagement with said limb.

- According to a further aspect of the invention there is provided a limb-immobilising structure incorporating a device as aforesaid.

- An embodiment of the invention will now be described by way of example only, and in relation to a device and structure as applied to a Colles's fracture of the radial bone. In the drawings:—
- 50

*Figure 1* is an exploded view of a device according to the invention,

- 55 *Figure 2* is a section through a human forearm surrounded by a plaster splint structure which includes the device of *Fig. 1*, and

*Figure 3* shows a stage in the application of the splint of *Fig. 2*.

- 60 As shown, the device 10 has a first part 11 comprising a square tube 12 having a closure element 13 at one end and a rectangular plate 14 at the other end. A second part 15 comprises a square tube 16 which can be
- 65 slidably received by the tube 12 and which

has at one end two lugs 17 which can pass through rectangular holes in the closure element 17. A rectangular plate 18 is secured across the other end of the tube 16, corre-

- 70 sponding sides of the plates 14, 18 having equal lengths. The lengths of the tubes 12, 16 are such that when the tube 16 is within the tube 12 and the plates 14, 18 are in contact, a retaining pin 19 (*Fig. 3*) may be
- 75 inserted through the holes in the lugs 17 to retain the parts 11, 15 in this relative position. A compression spring 20 is located between the plate 18 and the element 13 to bias the parts 11, 15 apart. Preferably, the
- 80 plate 18 has an area of not less than 4 square centimetres. The plate 18 may, however, have edges which are up to 5 and 4 centimetres in length, thereby having a total effective area of 20 square centimetres.

- 85 *Figs. 2 and 3* show the device 10 included in a plaster splint for a Colles's fracture of the radius. The fracture is first reduced manually and held in this condition. As shown in *Figs. 2 and 3* a felt pad 21 is interposed between the patient's wrist and the plate 18, the plate
- 90 18 having its longer median line located over the ulnar styloid. The part 15 is secured in this position by suitable adhesive tape. The spring 20 and part 11 are then assembled
- 95 onto the part 15 and held with the spring 20 compressed, by means of the pin 19, as shown in *Fig. 3*. Suitable padding 22 is placed around the limb and a splint is applied, by means of a plaster bandage 23, holding
- 100 the part 11 in position. The plaster splint 24 is applied so as to have a concavity at a location 25, and thereby to apply a pressure to the volar aspect of the distal radius proximal to the fracture. The plaster splint is also
- 105 formed so as to exert a pressure at a zone 25. Since the device 10 exerts pressure over the back of the radius distal to the fracture line, a three-point fixing of the relative parts of the fractured bone is achieved. This fixing is
- 110 maintained by the action of the device 10, even though tissue swelling reduces, and also during movement of the muscles of the forearm.

- It will be apparent that generally similar
- 115 procedures, modified as appropriate, may be used for different types of fracture and different locations. It will also be apparent that the plate 18 may be other than flat, if such a configuration is required for a particular type
- 120 of fracture.

- Preferably, the parts 11, 15 are of plastics material and may therefore be easily fabricated, as well as permitting the passage of X-rays. After the plaster has been removed from
- 125 the patient, the device 10 may readily be pressed out of the plaster and is then available for re-use.

- Tests have indicated that a device and splint structure according to the invention will
- 130 effect a substantial reduction in the percent-

age of Colles's fractures which slip during the period of splint application.

#### CLAIMS

- 5 1. A device for incorporation in an immobilising structure for a limb, said device comprising a first part adapted to be secured to said structure, a second part for engaging a limb immobilised by said structure, and a  
10 spring for biasing said second part towards said engagement.
2. A splint for a limb, said splint incorporating a device having a first part secured to said splint, a second part for engaging a limb  
15 located, in use, within said splint, and a spring for biasing said second part into contact with said limb.
3. A splint as claimed in claim 2 in which said first and second parts are relatively slidable and include means for preventing relative  
20 rotation therebetween.
4. A splint as claimed in claim 2 or claim 3 in which said second part includes a limb-engaging portion having an effective area of  
25 not less than four square centimetres.
5. A splint as claimed in claim 4 in which said limb engaging portion is substantially flat.
6. A splint as claimed in claim 2 in which  
30 said device includes means for restraining said first and second parts against movement under the influence of said spring.
7. A device for use in a splint, substantially as hereinbefore described with reference  
35 to the accompanying drawings.
8. A splint for a limb, substantially as hereinbefore described with reference to the accompanying drawings.

#### 40 CLAIMS (1 Aug. 1980)

1. A device for incorporation in an immobilising structure for a limb, said device comprising a rigid first part adapted to be secured to said structure, a rigid second part for  
45 engaging a limb immobilised by said structure, a spring for biasing said second part towards said engagement, and means for guiding said second part in a predetermined path relative to said first part.
2. A splint for a limb, said splint incorporating a device having a rigid first part secured to said splint, a rigid second part for  
50 engaging a limb located, in use, within said splint, a spring for biasing said second part into contact with said limb, and means for  
55 guiding said second part in a predetermined path relative to said first part.

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